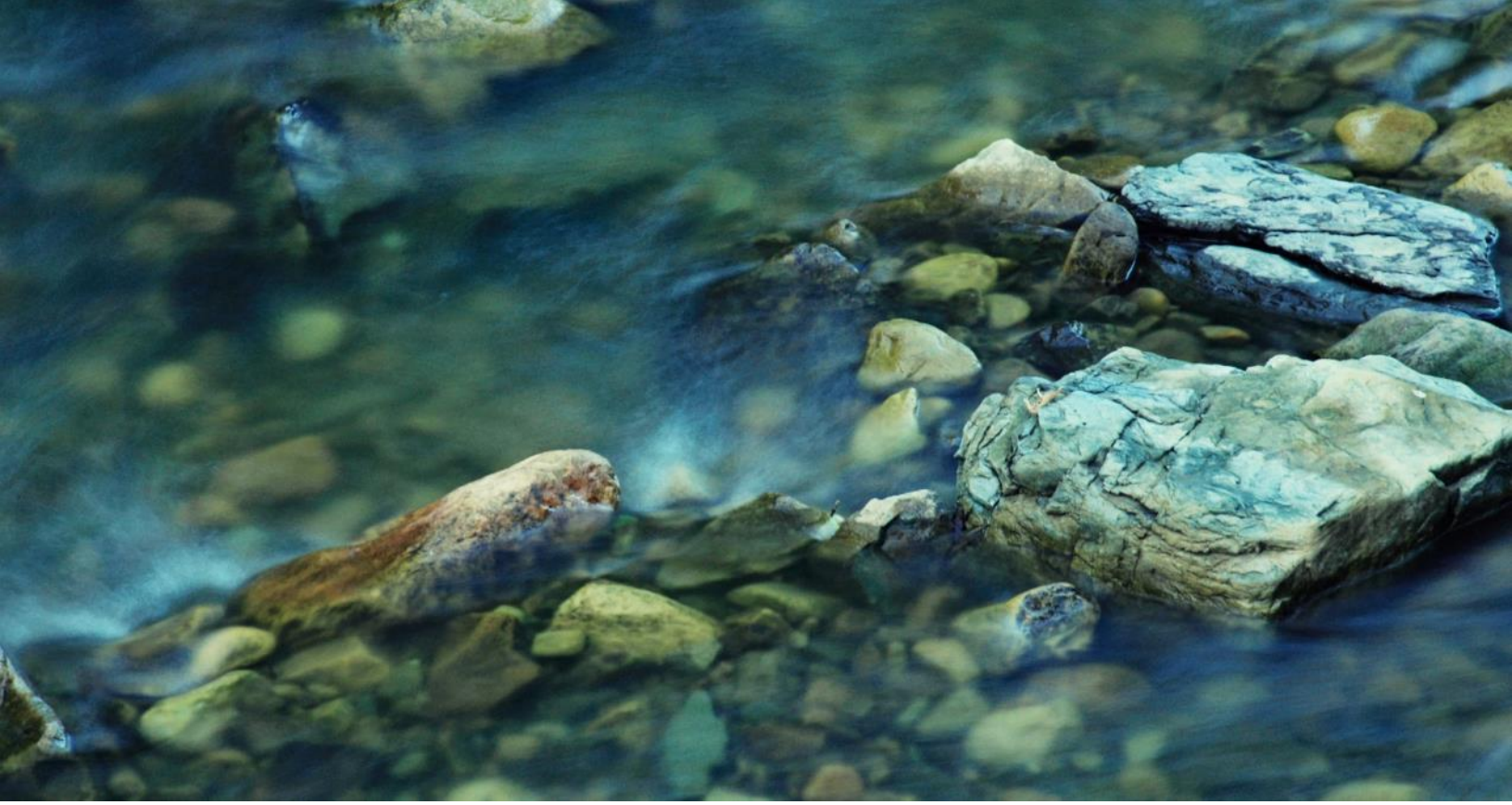

May 2020
Terminal 4 Phase I Removal Action

ANCHOR QEA

Amendment to the 2008 Interim Monitoring and Reporting Plan

Prepared for the Port of Portland

May 2020
Terminal 4 Phase I Removal Action

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Prepared for
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ABBREVIATIONS

AOC	Administrative Order on Consent
BiOp	Biological Opinion
DAR	Design Analysis Report
DGPS	differential global positioning system
IMRP	*Interim Monitoring and Reporting Plan*
MFM	Marine Facilities Maintenance
NAVD88	North American Vertical Datum of 1988
NGVD29	National Geodetic Vertical Datum of 1929
NMFS	National Marine Fisheries Service
Port	Port of Portland
ROD	Record of Decision
sf	square foot
T4	Terminal 4
USEPA	U.S. Environmental Protection Agency

1 Introduction

1.1 Purpose and Scope of the Amendment to the 2008 Interim Monitoring and Reporting Plan

This Amendment is intended to update the 2008 *Interim Monitoring and Reporting Plan* (IMRP; Appendix C of the *Final Design Analysis Report: Terminal 4 Phase I Removal Action* [DAR; Anchor 2008]). The 2008 IMRP (Appendix A) that currently governs monitoring was intended to be used for a maximum of 5 years between Phase I and Phase II of the Terminal 4 (T4) Early Removal Action project. However, Phase II of the Removal Action was delayed until after the Portland Harbor Record of Decision (ROD) was published by the U.S. Environmental Protection Agency (USEPA), which occurred in 2017 (USEPA 2017). As such, the IMRP has been in place much longer than intended and needs to be updated to address monitoring activities that have achieved performance standards (or are no longer applicable) and conditions that have developed since 2008. The purpose of the Amendment is to address the needed updates to the 2008 IMRP to better govern the interim monitoring of the Wheeler Bay Shoreline (Figures 1 and 2). Once the in-water remedy is complete at T4, this monitoring will be incorporated into the T4 long-term monitoring activities.

1.2 Updates to the 2008 Interim Monitoring and Reporting Plan

As discussed in Section 1.1, the 2008 IMRP has been in place much longer than originally anticipated, and aspects of the plan have become outdated. Based on 11 years of monitoring, some monitoring elements detailed in the IMRP are no longer necessary, and other monitoring elements need to be modified. Table 1 details the elements in the IMRP and the modifications to those elements.

After 11 years of monitoring activities at the Head of Slip 3 Cap Area, no issues have been identified related to cap stability, pinch-pile wall stability, or the presence of sheens. Conditions in the Cap Area are considered stable and are expected to remain stable, and the absence of sheens is expected to continue. To be consistent with the Portland Harbor ROD and future harbor-wide remedial effectiveness approaches that are currently under development, the focus of continued monitoring is on cap stability in the Head of Slip 3 Cap Area.

Overall, the Wheeler Bay shoreline is developing as expected into high-quality habitat. Prior monitoring activities identified issues along the Wheeler Bay shoreline related to erosion formation in 2010, 2011, 2017, and 2018 that required repairs as well as minor erosional areas that did not require repair. Further details are provided in Section 2. Other monitoring elements have either achieved performance standards or are no longer applicable. Therefore, the focus of continued monitoring is on slope stability and erosion in the Wheeler Bay Shoreline Stabilization Area, including native woody vegetation cover as it applies to bank stabilization.

1.3 Document Organization

The remainder of this Amendment includes the following sections:

- **Section 2—Background.** This section provides a brief overview of the shoreline stabilization design and monitoring history.
- **Section 3—Monitoring of Head of Slip 3 Cap Area.** This section discusses the monitoring activities that will be performed at the Head of Slip 3 Cap Area.
- **Section 4—Monitoring of Wheeler Bay Shoreline Stabilization Area.** This section discusses the monitoring activities that will be performed along the Wheeler Bay Shoreline.
- **Section 5—Monitoring Schedule.** This section provides the updated monitoring schedule for the Head of Slip 3 Cap Area and the Wheeler Bay Shoreline Stabilization Area.
- **Section 6—Response Actions.** This section explains the repair actions that would be taken to address slope failure or isolated scarps identified during monitoring of the Wheeler Bay shoreline stabilization.
- **Section 7—Isolated Scarp Repairs.** This section presents the programmatic approach that would be followed to repair future isolated scarps identified during monitoring.
- **Section 8—Reporting.** This section describes the reporting schedule and documentation that will be included in each report.
- **Section 9—References.** This section includes references for the citations used throughout this Amendment.

2 Background

2.1 History of Design and Implementation

The Port of Portland (Port) entered into an Administrative Order on Consent (AOC) with USEPA in October 2003 to perform a Non-Time-Critical Removal Action at the T4 site on the Willamette River in Portland, Oregon (Figure 1; USEPA 2003). Under the 2003 AOC and following negotiations with USEPA and its partners (USEPA 2006, 2007; Anchor 2007), the Port completed construction of the Phase I Removal Action. The Phase I Removal Action final design was completed and implemented in 2008 and included removal in Slip 3, capping in Slip 3, and stabilization of the Wheeler Bay shoreline to minimize contaminant migration to the river.

The 2008 design for the Wheeler Bay stabilization work was developed based on feedback from the agencies related to the 2006 *Design Analysis Report (Conceptual 30 Percent Design Deliverable)* (Anchor 2006a), which showed rock armor up to elevation 23.4 feet North American Vertical Datum of 1988 (NAVD88), and the subsequent update in the 2006 *Design Analysis Report (Prefinal 60 Percent Design Deliverable)* (Anchor 2006b), which included a bioengineering component to minimize the amount of rock armor used. The comment from the agencies requested that the Port and Anchor Environmental, LLC (now Anchor QEA, LLC), update the design to include habitat enhancements as much as possible rather than use only rock armor as part of the Wheeler Bay shoreline stabilization. The final 2008 shoreline stabilization design addressed this comment from the agencies and was implemented as part of the Phase I Removal Action.

2.2 Monitoring, Erosion, and Repairs in Subsequent Years

Monitoring activities of the Head of Slip 3 Cap Area and Wheeler Bay Shoreline Stabilization Area occur on a regular basis in accordance with the requirements of the IMRP (Appendix C of the DAR [Anchor 2008]) to determine if the Head of Slip 3 Cap is stable and if the Wheeler Bay Shoreline Stabilization is functioning as intended and meeting performance objectives. There have been no areas of instability observed during any monitoring event at the Head of Slip 3 Cap Area.

In June 2010 in Wheeler Bay, site monitoring activities found areas of erosion extending above elevation 18.4 feet NAVD88 and into the willow planting area. Erosion of the willow planting area was concentrated largely within the first 225 feet from the mouth of Wheeler Bay. The erosion likely occurred during a high-water event in the first 2 weeks of June 2010, when water levels were above 18.4 feet NAVD88 for a week with a peak water level of 19.4 feet NAVD88 (Figure 3). This erosion was repaired in October 2010. In general, the repair project consisted of removing the existing habitat layer and placing larger rock armor, where necessary, up to elevation 19.9 feet NAVD88 from Station 0+00 to Station 2+81 and placing anchored large woody debris along the top of the armoring along the full length of the slope.

Monitoring activities after a high-water event in May and June 2011 found additional areas of erosion (Figure 3). The Willamette River reached approximately elevation 22.0 feet NAVD88 during the high-water event, and the water level remained above the ordinary high water elevation (19.9 feet NAVD88) for more than 4 weeks and remained above 18.4 feet NAVD88 for 6 weeks. There were small areas of erosion noted during the monitoring event, with the most significant occurring along one section of shoreline between Stations 2+90 and 3+31, where the orange demarcation fabric was showing. In October 2011, rock armor was placed up to 24.4 feet NAVD88 to repair this area.

In 2017, two discrete sections of orange demarcation fencing (Station 4+00 and between Stations 6+55 and 6+80) were observed following the spring high-water event (Figure 3; Anchor QEA 2018a). In addition, two isolated areas of orange demarcation fabric were observed at Stations 3+75 and 5+25 in August 2018 during a post-high-water event monitoring (Figure 3; Anchor QEA 2018b).

Overall, the location of the scarps described above has been in the topsoil at the interface of where the topsoil associated with the planted willows meets the armor rock. The erosion mechanism for these scarps are a result of repeated wind and vessel wake energy when water levels rise to +18.4 feet NAVD88 or above and the repeated impacts from woody debris that have accumulated along the shoreline. The scarps have been contained to the topsoil interface and have not spread or indicated the presence of slope instability.

Table 2 details these erosional areas and any associated high-water events (Figure 3).

3 Monitoring of Head of Slip 3 Cap Area

To be consistent with the Portland Harbor ROD and future harbor-wide remedial effectiveness approaches that are currently under development, the focus of continued monitoring at the Head of Slip 3 Cap Area is on cap stability. A visual survey of the upland slope armor layer for sloughing and stability issues will be completed to determine if the cap is stable. Transects will be established on 40-foot spacings perpendicular to the shoreline (three transects). The observer will walk the transects at low water levels looking for evidence of instability. Areas of instability will be noted on drawings, and a differential global positioning system (DGPS) will be used to record coordinates where areas of instability are observed.

4 Monitoring of Wheeler Bay Shoreline Stabilization

4.1 Slope Stability and Presence of Erosion

A visual survey of the shoreline slope, including the armor layer, for sloughing and stability issues or erosion will be completed to determine if the slope is stable or if potentially contaminated soil beneath the existing surface is exposed due to erosion. Observers will walk the entire slope looking for areas of instability or areas where scarps have led to the exposure of orange demarcation fencing placed to identify the post-remediation interface under the existing surface during the 2008 shoreline stabilization work. Areas of instability will be noted on drawings, and a DGPS will be used to record coordinates where areas of instability or exposed orange demarcation fencing is observed.

4.2 Monitoring of Vegetation for Bank Stabilization

The vegetation across the entire shoreline area, including any scarp repair areas, will be evaluated to determine if the vegetation is serving its intended function of bank stabilization. The woody vegetation (willow planting area with native woody recruitments) between elevations +18.6 and +23.6 feet NAVD88 (+15 and +20 feet National Geodetic Vertical Datum of 1929 [NGVD29]) and hydroseeding (grass planting area) between elevations +23.6 and +33.6 feet NAVD88 (+20 and +30 feet NGVD29) will be monitored to confirm cover is occurring. Monitoring will include the evaluation of non-native species in vegetation areas disturbed by scarps or repair construction activities as part of regular vegetation monitoring; however, no further invasive species control measures will be implemented along the Wheeler Bay Shoreline because the vegetation aerial coverage goals were achieved and the native vegetation is expected to continue to thrive and out compete the non-native vegetation.

A quantitative survey of the willow planting area between elevations +18.6 and +23.6 feet NAVD88 (+15 and +20 feet NGVD29) will be completed on a regular basis (see Section 5) to determine percent coverage of willow and other native woody species. In accordance with the 2008 IMRP, the Point Intercept Transect procedure will be used to determine vegetation coverage. Grass coverage will be determined based on a visual assessment of the entire elevation +23.6 and +33.6 feet NAVD88 (+20 and +30 feet NGVD29) area coverage. The percent coverage data will be used in conjunction with the visual observations of the slope (see Section 4.1) to determine if the vegetation is still functioning for the purpose of bank stabilization.

In addition, following a high-water event, a qualitative assessment of the vegetation will be performed to identify if the high water caused any erosion that impacted the vegetation. A high-water event is any event where water levels exceed +18.6 feet NAVD88 (+15 feet NGVD29), which is the bottom elevation of the willow planting zone (i.e., +18.6 feet NAVD88 [+15 feet NGVD29]) where the topsoil associated with planted willows meets armor rock at lower elevations on the shoreline slope. Previous erosional events leading to the exposure of orange demarcation

fencing have only occurred when the water level has been above +18.6 feet NAVD88 (+15 feet NGVD29) (Table 2; Figure 3).

5 Monitoring Schedule

5.1 Head of Slip 3 Cap Stability

Monitoring will occur once every 5 years at the end of the high-water season during low water levels. Additional monitoring events will be triggered following a significant seismic event.

5.2 Wheeler Bay Shoreline Stabilization

Monitoring will occur once every 5 years. Additional monitoring events will be triggered as follows:

- After a high-water event when the water levels exceed +18.6 feet NAVD88 (+15 feet NGVD29), a qualitative monitoring event searching for areas of erosion will occur (see Section 4.2).
- After a significant seismic event or after Port Security observations of potentially erosive human use (e.g., trespassers, campers, or recreational boater use), a qualitative monitoring event searching for areas of erosion will occur.
- After the need to take a specific response action identified in Section 6, monitoring would occur the year after the response action was implemented.

6 Response Actions

This section discusses the specific response actions that would be taken if slope or armor layer failure or isolated scarp areas requiring repair are identified through the shoreline monitoring activities discussed in Section 3 for the Head of Slip 3 Cap Area and Section 4 for the Wheeler Bay Shoreline Stabilization. The intent of any response action for the Wheeler Bay Shoreline Stabilization Area is to avoid impacting native woody vegetation, the condition of which will be documented during regular vegetation monitoring events. In cases where impacting native woody vegetation is unavoidable, vegetation would be replaced and subsequently monitored the following year and once every 5 years as part of the interim monitoring event (Section 5.2).

6.1 Slope Failure

6.1.1 Head of Slip 3 Cap

Slope failure along the Head of Slip 3 Cap Area is characterized by cap stability issues that compromise the protective armor layer placed as part of the 2008 Phase I Removal Action project. Slope failure is indicated by visual observations of substantial armor layer movement (e.g., rotated or shifted armor rock). No issues have been identified during 11 years of monitoring, and conditions in the Cap Area are considered stable and are expected to remain stable.

6.1.2 Wheeler Bay Shoreline Stabilization

Slope failure along the Wheeler Bay Shoreline is characterized by large-scale sloughing, stability issues, or erosion over large sections of the shoreline that compromise the underlying global structural integrity and long-term stability of the existing shoreline slope that was constructed as part of the 2008 Phase I Removal Action project. Slope failure is indicated by visual observations of ground movement above or below a scarp (e.g., tension cracks, rotated vegetation, rotated soil blocks or layers, or other unnatural indications that differ from previous investigation). If these conditions are identified, the Port will further investigate the slope for potential slope failure. If slope failure is identified, a slope stabilization repair would be necessary. The first action would be to determine the cause of failure. Based on findings, resulting actions could include slope regrading (excavation and/or placement of import material may be necessary) or placement of additional armor stone or larger armor stone capable of withstanding erosive forces imparted on the shoreline. Existing documents, identified in Section 6.3, would be used to guide slope failure repair. The specific slope failure repair approach, including materials, methods, personnel, and sequencing, would be conducted with approval from USEPA and its partner agencies.

6.2 Isolated Scarp Areas

The following subsections discuss a programmatic approach to addressing isolated scarp areas identified for repair based on monitoring. An area in which erosion has exposed the orange demarcation fencing of topsoil will be considered an isolated scarp unless there are visual indications of ground movement above or below the scarp (e.g., tension cracks, rotated vegetation, rotated soil blocks or layers, or other unnatural indications that differ from the previous investigation). If these conditions are identified, the site will be further investigated for potential slope failure (Section 6.1). Isolated scarp areas may lead to exposure of the orange demarcation fencing over sections of the shoreline, which potentially exposes contaminated soils. The fencing was installed to identify the post-remediation surface as part of the 2008 Phase I Removal Action project.

6.2.1 Sampling of Isolated Scarp Areas

Anywhere along the shoreline where exposed orange demarcation fencing is associated with an isolated scarp area, additional soil sampling and/or repair will be required. The analytical suite will consist of analytes found in the ROD Table 17 plus chlorobenzene. Analytes will be compared against the Table 17 cleanup levels and ROD Table 21 remedial action levels and principal threat waste thresholds. Pending USEPA concurrence, a scarp sample that exceeds cleanup levels will not necessarily require repair and will be monitored for stability.

6.2.2 Repair of Isolated Scarp Areas

Isolated scarp areas with exposed orange demarcation fencing over a contiguous area that is less than or equal to 60 square feet (sf) would be repaired using an approach similar to the 2019 repairs as detailed in the USEPA-approved *Final Wheeler Bay Shoreline Stabilization Repair Work Plan* (Anchor QEA 2019). This approach is discussed in Section 7 of this document. Any necessary repairs would be performed automatically as part of the Port's regular marine maintenance program. USEPA and its partners would be notified 14 days prior to any repair activities as described in Section 7.3.5.

Repaired areas would be monitored the year after the repair, as described in Section 5.2.

6.3 Related Design Documents

The response actions, including the scarp repair activities in this Amendment, are consistent with the existing USEPA-approved 2008 design and compliance documents. As such, no additional documents are needed for implementation of response actions for isolated scarp areas defined in Section 6.2. The relevant existing documents include the following:

- *Final Design Analysis Report: Terminal 4 Phase I Removal Action* (Anchor 2008)
- Biological Opinion (BiOp) for the Port of Portland Terminal 4 Superfund Phase I of the Removal Action, July 22, 2008 (NMFS 2008)
- *Supplemental Section 404(b)(1) Evaluation, Terminal 4 Phase I Removal Action* (USEPA 2008)

Response actions are consistent with the DAR (Anchor 2008). For example, the performance standards for the shoreline stabilization design identified in 2008 are the same standards that would be used for any future response actions. The mechanisms of past isolated erosion events are documented in the October 2018 memorandum, "Wheeler Bay Shoreline Stabilization Proposed Repair Approach" (Anchor QEA 2018b). The issue at the site is that the topsoil within the planted willow zone is not as robust as armor rock and, therefore, does not withstand erosive forces associated with wave energy and impacts from woody debris. The repairs conducted in 2010, 2011, and 2019 for identified scarp areas have used revised approaches to improve outcomes.

The BiOp and Supplemental Clean Water Act Section 404(b)(1) compliance documents are still applicable for governing the proposed response actions for the following reasons:

- The National Marine Fisheries Service (NMFS) confirmed that the 2008 BiOp has continued applicability should future shoreline repairs be required that are consistent with previous repairs (Angle 2020).
- The footprint of any future response actions would be within the overall footprint used for developing the 2008 compliance documents.
- Any future response actions would be similar to the actions analyzed in the 2008 compliance documents.
- The means, methods, and materials used for constructing the 2008 shoreline stabilization area would also be the same or similar for future response actions.
- The terms and conditions and conservation measures identified to minimize potential impacts to listed species in the BiOp would again be applied to any future response actions.
- This approach was successfully used for the previous repair activities constructed in 2010, 2011, and 2019.

NMFS also confirmed that no additional mitigation will be required on future shoreline repairs that are consistent with previous repairs (Angle 2020).

7 Isolated Scarp Repairs

Any isolated scarps with exposed orange demarcation fencing identified in the shoreline area that is contiguous over an area less than or equal to 60 sf would either require additional sampling to determine if repairs would be necessary or would be repaired automatically. If isolated scarps exposing orange demarcation fabric are determined to require repairs by additional sampling or repaired automatically, the repairs would be programmatically addressed as described in Sections 7.1 through 7.3. This approach was successfully used for the 2019 repair activities that occurred in Wheeler Bay. The information in Sections 7.1 through 7.3 was adapted from the *Final Wheeler Bay Shoreline Stabilization Repair Work Plan* (Anchor QEA 2019) to meet the goals of a programmatic repair approach.

7.1 Repair Overview

Repairs would be conducted in future isolated areas where the orange demarcation fencing is exposed over a contiguous area less than or equal to 60 sf within the entire Wheeler Bay shoreline area. These repairs would be conducted by the Port as part of regular ongoing maintenance activities at T4.

In general, future repairs would consist of placing rounded rock over a filter layer of sand and gravel in the isolated erosion areas exposing the orange demarcation fencing (Figure 4). Prior to the placement of any import materials, filter fabric would be placed directly on the existing surface and affixed using stakes, or similar securing item, to minimize transport of contaminated material through the filter layer and surface rounded rock fill.

7.2 Description of Work to Be Performed

The Port would have its Marine Facilities Maintenance (MFM) group perform the work, which is a more practical approach given the limited scope and maintenance type of work. Depending on the scope of work, it is expected the work would take 1 to 5 days to complete; however, construction duration would depend on coordination with T4 operations at the top of bank. Equipment used for the repairs located on the top of bank would be stationed immediately adjacent to the railroad tracks used for operations. To allow for locomotives and product transport to occur, the MFM group would keep equipment away from the railroad tracks. The Port would coordinate with its tenant(s) to determine construction timing with the goal of avoiding stand-down time due to facilities operations.

7.2.1 Repair Team

The repair work would be performed by the Port's MFM group, which has crews with extensive experience working at T4. Their main facility is located just across the street from T4 at 10801 North Lombard Street in Portland, Oregon. The MFM group would hire a conveyor contractor (e.g.,

Dan Jones Conveyored Aggregate Delivery of Portland) to deliver, convey, and place the material at the repair locations.

7.2.2 Materials and Equipment

As shown in Figure 4, two materials would be placed over a filter fabric in each isolated erosion area. The materials and equipment that would be used to place them are described as follows:

- **Filter fabric:** Filter fabric would be placed at each location prior to placing any import material. The filter fabric would consist of polypropylene, needle-punched, non-woven geotextile such as Mirafi 160N or equivalent.
- **Filter material:** Following the 2008 Wheeler Bay stabilization portion of the Phase I Removal Action construction, the Port had approximately 85 cubic yards of habitat cover (i.e., a mixture of sand and rounded gravel) material in a remaining stockpile at the T4 site for future use. This material, which was tested and approved for use at the site in 2008 (chemical and physical characterization results included in Appendix B2 of the *Final Removal Action Completion Report* [Anchor QEA 2009]), was used in the 2019 Wheeler Bay repair work as a filter layer to prevent winnowing of finer-grained shoreline soils through pore spaces in the larger-grained surface layer.[1] This material would be used as the filter material for any future repairs. If additional filter material is needed beyond the current on-site stockpile, testing will consist of analytes found in the ROD Table 17. Analytes will be compared against the Table 17 cleanup levels and ROD Table 21 remedial action levels and principal threat waste thresholds to inform USEPA approval of the material. Methodologies are included in the *Construction Quality Assurance Plan* (Appendix A of the DAR). Additional filter material details are included in Appendix B of this Amendment.
- **Surface rounded rock fill:** The surface material would consist of rounded rock fill sourced from a local quarry, such as CalPortland's facility located at 33485 Crown Zellerbach Road in Scappoose, Oregon, or similar. The material would contain rounded rocks between 2 and 6 inches with no material larger or smaller than this range. Similar materials that do not fit this specification will be considered as necessary based on future material availability. Due to the size of the rounded rock that would be placed, chemical contaminants are not expected to be present on the material because contaminants attach to finer-grained material. Therefore, no

[1] For the filter layer in the 2019 repair work, a filter fabric layer (i.e., geotextile) was placed above the existing bank fill before the filter material (i.e., habitat cover) was placed. The geotextile layer was intended to provide the same function as the filter material (i.e., to limit transport of contaminated material upward through the rounded rock), making it difficult to evaluate the effectiveness of the filter material versus the geotextile. While an evaluation of the filter layer functionality in the 2019 repair work has not yet been performed, based on the filter material properties, the filter material should function as intended. In addition, the maximum gage height (U.S. Geological Survey 14211720) that has occurred since the repairs were completed was measured on February 8, 2020, and was at a water level of +15.24 feet NAVD88, which would not have reached the elevation at which the material was placed. Therefore, the filter layer has not been inundated since it was placed, and its performance has not been tested.

chemical testing of this rock would be performed. Additional surface rounded rock fill details are included in Appendix B.

The filter material and surface rounded rock fill would be transported to the isolated repair areas and would be spread over the required areas to meet the target thickness using construction conveyor equipment and hand tools. It is anticipated that construction conveyor equipment would be used above elevation +30 feet NAVD88, and hand tools would be used at and below elevation +30 feet NAVD88.

Because the material is being placed to fill isolated areas of erosion to blend in with the existing grade, the minimum required placement thicknesses of each material would depend on the characteristics of each individual area of erosion. Therefore, the anticipated target range for each area is 3 to 12 inches of filter material and 9 to 24 inches of surface rounded rock fill tapering to a possible thinner section at the edges where existing material is present but thinned. The thicknesses will be refined during a pre-construction site walk (discussed in Section 7.2.3).

7.2.3 Repair Sequencing

The repair work would be constructed with the following general sequencing used for the 2019 repair activities:

1. The surface rounded rock fill would be delivered and either stockpiled on site or offloaded directly from the truck to the conveyor. Either approach would be done at the top of the riverbank.
2. A pre-construction site walk would be conducted to demarcate the lateral extents of material placement for each location. It is anticipated that construction paint or survey stakes would be used to demarcate material placement extents. In addition, location-specific material placement thicknesses would be determined.
3. The MFM group would mobilize equipment and personnel to the site to perform the work.
4. Each area of erosion would be cleared, as feasible, of debris and pruning of existing vegetation to facilitate material placement.
5. Filter fabric would be placed on the existing surface (i.e., on the orange demarcation fencing) at each repair location.
6. Filter material would be transported from the stockpile to each location and placed to achieve targeted thickness determined during the preconstruction site walk.
7. Surface rounded rock fill would be transported via conveyor equipment and placed to achieve targeted thickness determined during the pre-construction site walk.
8. Following completion of surface rounded rock fill placement, the MFM group would clean up the work site and demobilize equipment and personnel.

9. The Port would conduct a post-construction visual survey to document the condition of the repaired areas.

7.3 Planning and Project Coordination

The following subsections provide information about the planning and project coordination required to ensure the repair work is completed in accordance with this Amendment and any previous documents (i.e., the 2008 Clean Water Act 404(b)(1) Analysis [USEPA 2008], BiOp [NMFS 2008], and DAR [Anchor 2008]).

7.3.1 Health and Safety Plan

The *Site-Specific Health and Safety Plan (HASP) for Existing Hazardous Materials Releases* (Appendix C) takes into consideration the provisions of Oregon Administrative Rule 437 Division 2, Subdivision H, and Division 3, Subdivision D. The planned repair activities do not include cleanup operations, Resource Conservation and Recovery Act hazardous waste operations, or emergency response operations defined in 29 Code of Federal Regulations 1910.120(a)(1)(i) through 1910.120(a)(1)(v).

7.3.2 Environmental Considerations

The following environmental considerations would be followed during the completion of all construction activities:

- **Fuel and oil storage:** No fuel or oil would be stored on site except for that contained in the fuel tanks on trucks or heavy equipment.
- **Impacted material:** It is not anticipated that any equipment would come in contact with impacted shoreline soil; however, if it becomes apparent that equipment has come in contact with impacted shoreline soil, the equipment would be decontaminated prior to being taken off site.
- **In-water work:** No in-water work is anticipated. All work would be completed in the dry (i.e., above the waterline).
- **Material stockpiling:** If imported materials are stockpiled, the material would be placed at the top of the riverbank in a way that limits dust.
- **Spills:** In case of spills, Port Marine Security, the USEPA Project Manager, and the Port Project Manager would be notified immediately. In addition, the following agencies would be notified depending on the type and severity of the spill:
  - National Response Center: 800-424-8802
  - U.S. Coast Guard: 503-240-9365
  - Oregon Emergency Response System: 800-452-0311

- **Waste management:** Any debris removed from the repair areas would be disposed of at a landfill. No other material wastes are expected to be generated for this work.
- **Migratory Bird Treaty Act:** Migratory birds may use the restored riparian habitat along the Wheeler Bay shoreline for nesting. The migratory bird nesting season occurs from February 1 to July 31. Because of the existing in-water work window (July 1 and October 31) and constraints associated with the Port tenant (Kinder Morgan) operations, repairs will be conducted within the in-water work window and during times when Kinder Morgan temporarily shuts down for routine maintenance of its facility. If repairs must occur in July, a survey will be conducted of the vegetation area that will be impacted for migratory bird nests to avoid any potential impacts.
- **Weather:** Repair work will be avoided during heavy rain events (defined as a storm that produces 0.5 inch of rain or more during any 24-hour period). If work must proceed during such storm events, straw wattle or similar temporary erosion controls will be implemented between the extents of work and Wheeler Bay.

7.3.3 Quality Assurance/Quality Control

The repair work quality assurance/quality control measures would be implemented by the Port's MFM group. The following measures would be followed during construction:

- **Survey control:** If surveys are needed,[2] the Port would use established project site reference points confirmed by the Port's Engineering Project Surveyor.
- **Intermediate and post-construction survey:** To confirm the desired coverage meets project requirements, material placement and thickness would be visually verified as areas are completed. In addition, the contractor will use construction stakes to identify the target placement thickness (i.e., using measured marker lines on stakes within the placement area). Following completion of the work, the Port would take pictures of the repair areas to document the final post-construction surface. A final figure showing the repair locations would be included as part of the annual January 15 monitoring report submitted to USEPA.
- **Import material characterization:** As described in Section 7.2.2, the proposed surface rounded rock fill consists of 2- to 6-inch-sized rock that does not contain fine-grained material in which contaminants are typically present. Based on the lack of fine-grained material, the surface rounded rock fill meets the import material chemical goals presented in the DAR (Anchor 2008). The filter material that was stockpiled following the 2008 Wheeler Bay stabilization portion of the Phase I Removal Action work was characterized and approved for use at Wheeler Bay

[2] These surveys would not be done for isolated scarps that would be repaired using the programmatic approach. If repairs are needed for larger areas than the isolated scarps, the Port would coordinate with USEPA on an appropriate path forward. If the shoreline has only minor isolated scarps, it is not expected that an updated topographic survey will be required prior to the repair work. During spot repairs, the Port will conduct a pre-construction, intermediate, and post-construction visual survey over the repair areas to confirm the desired coverage meets project requirements.

(Anchor QEA 2009). The filter material would, therefore, not require additional characterization for the repair work. However, if additional filter material is needed beyond the material stockpiled on site, testing would be performed to ensure the material meets the import material chemical goals presented in the DAR (Anchor 2008). Methodologies are included in the *Construction Quality Assurance Plan* (Appendix A of the DAR).

7.3.4 Green Remediation

This section details how the repair work would implement the green remediation measures identified in USEPA Region 10's "Clean and Green Policy" and their applicability to the repair work. In addition, ASTM International E2893-16 (2016), *Standard Guide for Greener Cleanups*, was reviewed to confirm that these green remediation measures conform to the intent of this standard.

The project would involve placing sand, gravel, and rock material within the isolated erosion areas. Filter material would consist of on-site stockpiled sand and gravel, and surface material of 2- to 6-inch rounded rock fill would be externally sourced, anticipated to be imported from a local quarry such as CalPortland's facility at 33485 Crown Zellerbach Road in Scappoose, Oregon. The local quarry would be nearby. Native vegetation in the vicinity of the placement areas would be protected from material placement, and equipment and vehicles would not be left to idle during the work. Oregon state law allows the engine of a commercial vehicle to idle for no more than 5 minutes in a continuous 60-minute period with several exemptions (see Oregon Revised Statutes 825.600 to 825.615 for idling regulations and exceptions [e.g., queuing, temperature control for driver comfort, situations in which driver has no control, and safe operations]). Idling while waiting to load or unload shall also be limited to no more than 5 minutes, subject only to the exemptions outlined in Oregon state law.

The following measures would be followed to the extent possible during the repair work:

- **Materials**
  - Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures.
- **Project planning and team management**
  - Choose equipment and product vendors with production and distribution centers near the site to minimize fuel consumption associated with delivery.
- **Site preparation and land restoration**
  - Minimize clearing of trees and other vegetation throughout investigation and cleanup.
  - Replace native woody vegetation if removed, and subsequently monitor the restored vegetation in order to maintain natural ecosystems.

  - Restrict traffic to confined corridors to minimize soil compaction and land disturbance during site activities.
  - Reuse on-site or local clean materials (e.g., on-site stockpiled sand and gravel material) rather than importing additional material for fill.
- **Vehicles and Equipment**
  - Implement idle reduction practices consistent with Oregon state law.

7.3.5 Project Communications and Coordination

The following communications and coordination would occur before, during, and immediately after construction:

- The Port would notify USEPA of the anticipated start of the repair work 14 days prior to the expected repair start date.
- The Port would convene a pre-construction meeting/initial safety meeting at which the lateral extents of material placement will be demarcated and the target material thicknesses to be placed in each area of erosion will be determined given location-specific characteristics.
- The Port would provide verbal and written notification to USEPA of completion of the repair work within 1 day of completion.
- The Port would document the repair work as part of the interim monitoring (i.e., operations and maintenance) reporting submittal to USEPA.

8 Reporting

Monitoring reports will be submitted to USEPA following a monitoring event. Monitoring reports will be submitted to USEPA on January 15 of the year following the monitoring. The frequency of reporting will occur once every 5 years. The last regular monitoring event was completed in 2019; therefore, the next regular monitoring event will occur in 2024. In addition, if a high-water event of +18.6 feet NAVD88 (+15 feet NGVD29) or higher occurs, a significant seismic event takes place, or potentially erosive human use is observed by Port Security during years with no regular monitoring planned, additional qualitative monitoring would occur to search for areas of erosion. If isolated scarps requiring repair are identified, USEPA would be notified 14 days prior to starting the repair work. Additional monitoring of the repaired areas would occur the year following the repair and would be documented in a memorandum to USEPA. The memorandum would include a repair tracking form that will be used to document the repair of isolated scarp areas that are less than 60 sf. The form will include details of the repair location so that potential problem areas (e.g., repeated erosional issues) can be tracked. A sample repair tracking form is provided in Appendix D.

The purpose of the repair area monitoring is to confirm that the placed material has generally remained in place and that the orange demarcation fencing remains covered by the placed material.

Monitoring reports will include results of the regular monitoring activities, documentation of additional monitoring triggered between the regular 5 year monitoring events, a photograph log, and figures. Reports will also include a summary of any repairs that occur within the 5-year period, a figure showing all the repaired areas, and the memoranda documenting the repairs (as attachments).

9 References

Anchor (Anchor Environmental, LLC), 2006a. *Design Analysis Report (Conceptual 30 Percent Design Deliverable)*. Terminal 4 Early Action, Port of Portland, Portland, Oregon. Prepared for the Port of Portland. August 2006.

Anchor, 2006b. *Design Analysis Report (Prefinal 60 Percent Design Deliverable)*. Terminal 4 Early Action, Port of Portland, Portland, Oregon. Prepared for the Port of Portland. December 2006.

Anchor, 2007. *Abatement Measures Proposal: Terminal 4 Removal Action Project*. Prepared for the Port of Portland, by Anchor Environmental. October 25, 2007.

Anchor, 2008. *Final Design Analysis Report*: *Terminal 4 Phase I Removal Action*. Port of Portland, Portland, Oregon. Prepared for the Port of Portland. June 30, 2008.

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Angle, Genevieve (NOAA Fisheries), 2020. Regarding: NMFS Input - Terminal 4 Wheeler Bay Monitoring Plan Update. Email to: Kelly Madalinski (Port of Portland). April 16, 2020.

NMFS (National Marine Fisheries Service), 2008. *Endangered Species Act-Section 7 Consultation Biological Opinion & Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation*. Prepared for USEPA and Port of Portland Terminal 4 Superfund Phase I of the Removal Action, Willamette River (HUC 17090012), Multnomah County, Oregon. July 22, 2008.

USEPA (U.S. Environmental Protection Agency), 2003. Administrative Order on Consent for Removal Action in the Matter of Portland Harbor Superfund Site, Terminal 4, Removal Action Area, Portland, Oregon.

USEPA, 2006. Action Memorandum for Removal Action at the Port of Portland Terminal 4 site within the Portland Harbor Superfund Site, Portland, Multnomah County, Oregon. May 11, 2006.

USEPA, 2008. *Supplemental Section 404(b)(1) Evaluation, Terminal 4 Phase I Removal Action*. June 30, 2008.

USEPA, 2017. *Record of Decision*. Portland Harbor Superfund Site; Portland, Oregon. Prepared by U.S. Environmental Protection Agency, Region 10, Seattle, Washington. January 2017.

Tables

Table 1
IMRP Elements and Amendment Modifications

2008 IMRP Element		2008 IMRP Report	Amendment Inclusion	Rationale/Modification
Berth 411 "Plus" Dredging	Post-Dredging Sediment Sampling	Section 2.2	Not included	Sediment sampling occurred immediately following construction as intended and is complete with no further action needed.
Head of Slip 3 Cap Area	Cap Stability	Section 3.2	Modified	No issues have been identified during 11 years of monitoring. Conditions in the cap area are considered stable and are expected to remain stable. Additionally, elements of the Amendment outline a visual survey of the Head of Slip 3 Cap Stability (Section 3).
	Pinch-Pile Wall Stability	Section 3.2	Not included	The pinch-pile wall was surveyed between 2008 and 2012, and USEPA approved discontinuing the survey on January 16, 2013, and February 16, 2013, with the approval of the Year 4 Interim Monitoring Report (Sheldrake 2013a, 2013b).
	Presence of Sheens	Section 3.3	Not included	No visual presence of sheens has been observed in the 11 years of monitoring. In addition, visual survey of sheens continues to be conducted as part of the upland LNAPL removal and groundwater monitoring program (Ash Creek/BBL/Newfields 2005; Ash Creek 2009).
Wheeler Bay Shoreline Stabilization	Slope Stability	Section 4.2	Modified	Modified methodologies based on results of 11 years of monitoring are detailed in Section 4 of the Amendment.

Table 1
IMRP Elements and Amendment Modifications

2008 IMRP Element		2008 IMRP Report	Amendment Inclusion	Rationale/Modification
	Armor Layer Stability	Section 4.4	Modified	No issues have been identified during 11 years of monitoring. Armor layer is considered stable and expected to remain stable. In addition, elements of the Amendment outline a visual survey of the Wheeler Bay bank slope, which includes the armor layer (Section 4).
	Vegetation Coverage for Bank Stabilization	Section 4.3	Modified	Year 5 vegetation cover goals were achieved in Wheeler Bay. Modifications include both a quantitative survey and qualitative survey of the Wheeler Bay Shoreline Stabilization Area as described in Section 4 for the purposes of bank stabilization. Non-native species in vegetation areas disturbed by scarps or repair construction activities will be evaluated as part of regular vegetation monitoring; however, no further invasive species control measures will be implemented along the Wheeler Bay Shoreline.

Notes:
IMRP: *Interim Monitoring and Reporting Plan*
LNAPL: light nonaqueous phase liquid
USEPA: U.S. Environmental Protection Agency

References:

Ash Creek, 2009. Site Closure Evaluation and Recommendation – Groundwater, Terminal 4 Slip 3 Upland Facility. May 14, 2009.

Ash Creek/BBL/Newfields, 2005. *LNAPL Removal, Groundwater Monitoring and Contingency Plan, Terminal 4 Slip 3 Upland Facility*. June 16, 2005.

Sheldrake, Sean, 2013a. Regarding: Year 4 Interim Monitoring Report, Terminal 4 Phase I Removal Action, Port of Portland, Portland, Oregon. Email to: Kelly Madalinski (Port of Portland). January 16, 2013.

Sheldrake, Sean, 2013b. Regarding: Year 4 Interim Monitoring Report, Terminal 4 Phase I Removal Action, Port of Portland, Portland, Oregon. Email to: Kelly Madalinski (Port of Portland). February 16, 2013.

Table 2

Wheeler Bay Shoreline Stabilization Erosional and Associated High-Water Events

Erosion Observation Date	Location Description	Exposed Orange Demarcation Fabric	Associated High-Water Event	Associated High-Water Event Date
June 21 and 25, 2010	Station 00+00 to 02+25 – Erosion scarp along the bottom elevation of the willow planting zone, ranging from 0 to 2 feet in depth	Yes	Yes[3]	First 2 weeks of June 2010
	Station 02+60 to 03+00 – Erosion scarp along the bottom elevation of the willow planting zone, ranging from 0 to 1 foot in depth			
	Station 03+00 to 03+23 – Erosion scarp along the bottom elevation of the willow planting zone, less than 0.5 foot in depth			
June 29, 2011	Station 02+90 to 03+31 – Erosion scarp along the bottom elevation of the willow planting zone, 2 feet in depth	Yes[1]	Yes[4]	May and June 2011
July 11, 2017	Station 04+00 – Erosion scarp along the bottom elevation of the willow planting zone, 1.3 feet in depth	Yes (minor)	Yes[5]	March 2017
	Stations 06+55 to 06+80 – 4 erosion scarps along the bottom elevation of the willow planting zone, ranging from 1.3 to 2.2 feet in depth	Yes[2]		March 2017
August 2018	Stations 03+75 and 05+25 – 2 erosion scarps along the bottom elevation of the willow planting zone, 1 foot in depth	Yes	Yes[6]	May 2018

Notes:

1. Orange demarcation fabric visible and exposure amount ranged from patches to several feet into the slope.

2. Orange demarcation fabric visible in discrete sections associated with three of the four scarps.

3. Water level reached an elevation of +19.1 feet North American Vertical Datum of 1988 (NAVD88; +15.5 feet National Geodetic Vertical Datum of 1929 [NGVD29]).

4. Water level reached an elevation of +22.3 NAVD88 (+18.7 feet NGVD29), and the water level remained above the ordinary high water elevation of +20.2 NAVD88 (+16.6 feet NGVD29) (ordinary high water [OHW] level) for more than 4 weeks.

5. Water level reached an elevation of +22.4 NAVD88 (+18.8 feet NGVD29), and the water level remained above the OHW level for approximately 3 weeks.

6. Water level reached an elevation of +20.65 NAVD88 (+17.05 feet NGVD29), and the water level remained above the OHW level for approximately 2 weeks.

Figures

LEGEND:

- Wheeler Bay Shoreline Area
- Head of Slip 3 Cap
- Navigation Channel
- Shoreline Structures

NOTES:

1. Arrow indicates direction of flow of river.
2. Horizontal datum is NAD83 Oregon State Plane North, International Feet.
3. Aerial imagery from City of Portland 2016.
4. Sediment Decision Unit boundary extends approximately 1,000 feet upstream from the extent shown.

0 250
Feet

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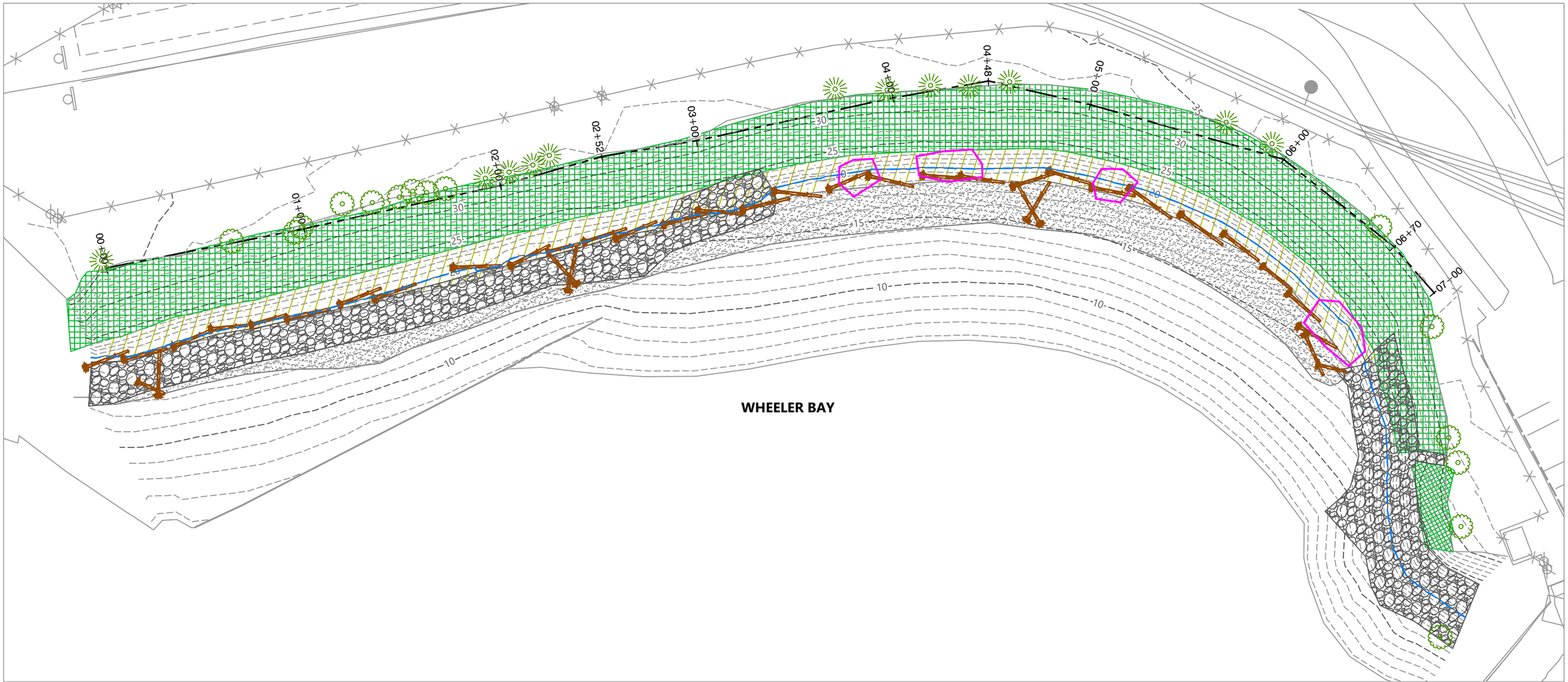
Filepath: \\orcas\GIS\Jobs\PortOfPortland_0332\PortlandHarborFS\Maps\Memos\WheelerBaySlope\AQ_Fig1_SiteLocation.mxd

ANCHOR QEA

Figure 1
Site Location
Amendment to the 2008 Interim Monitoring and Reporting Plan – Terminal 4 Phase I Removal Action
Port of Portland



NOTES:
1. Horizontal Datum: Port of Portland, Local Projection (International Feet); Vertical Datum: NAVD88
2. Pre-construction survey by Port of Portland dated October 2018.

LEGEND:

- Existing Hydroseeding With Jute Matting
- Existing Willow Planting Zone
- Existing Habitat Material Over Armor Rock
- Existing Armor Rock
- Existing Habitat Log (Anchored)
- -25 October 2018 Contours (1' & 5' Intervals)
- Ordinary High Water (+19.94 NAVD88)
- Existing Deciduous Tree
- Existing Evergreen Tree
- Existing Fence
- 00+00 Project Station Line
- 2019 As-Built Repair Areas

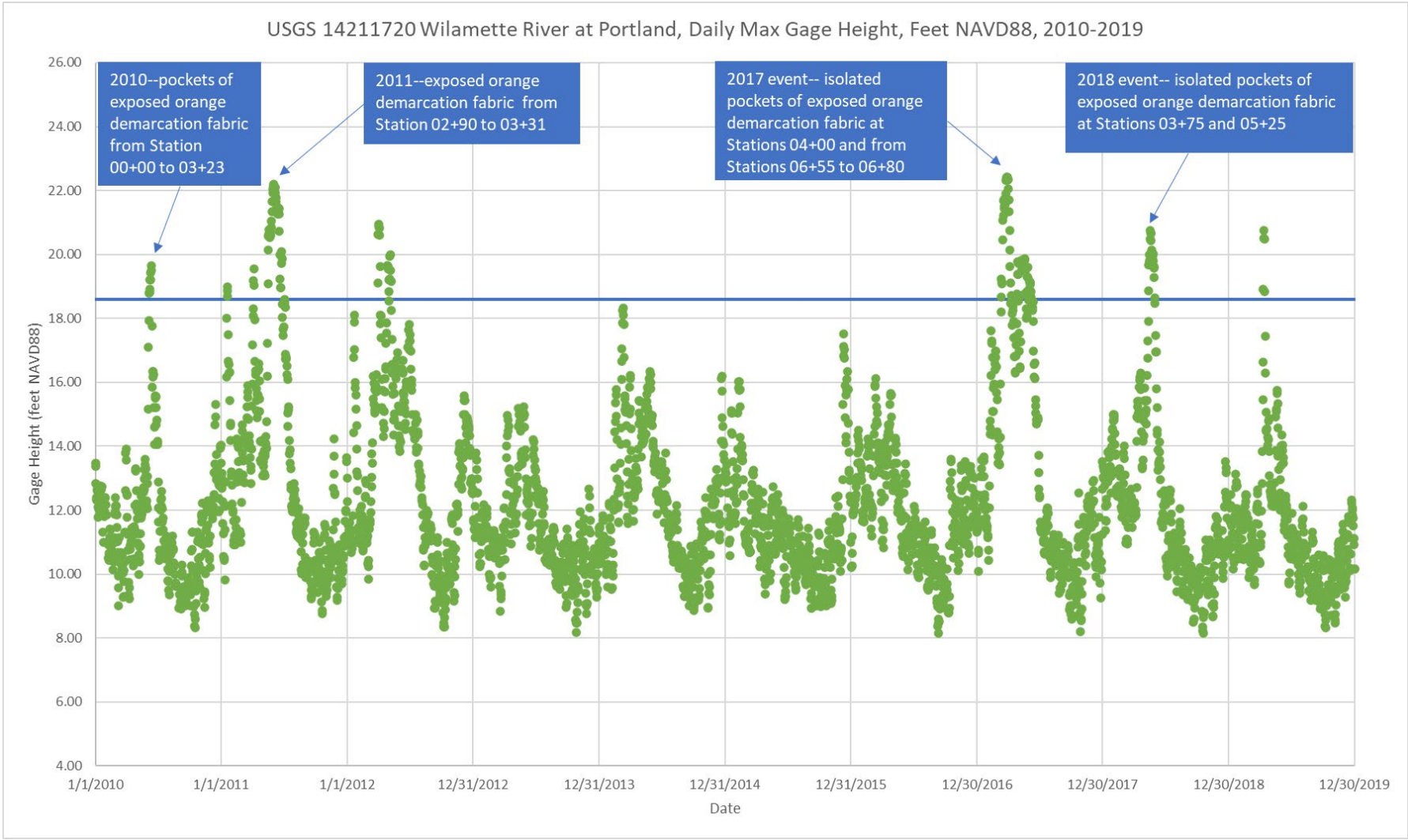
0 50
Feet

Publish Date: 2020/05/18 3:27 PM | User: tgriga
Filepath: K:\Projects\0332-Port of Portland\Interim Monitoring & Reporting - T4RA\Task 7 - Adaptive Management Activities\0332-RP-002 Shoreline Stabilization.dwg Figure 2

ANCHOR QEA

Figure 2
Wheeler Bay Shoreline Stabilization

Amendment to the 2008 Interim Monitoring and Reporting Plan – Terminal 4 Phase I Removal Action
Port of Portland



Note:

Each dot represents the daily maximum gage height as recorded by USGS Gage 14211720 (Portland, Oregon).

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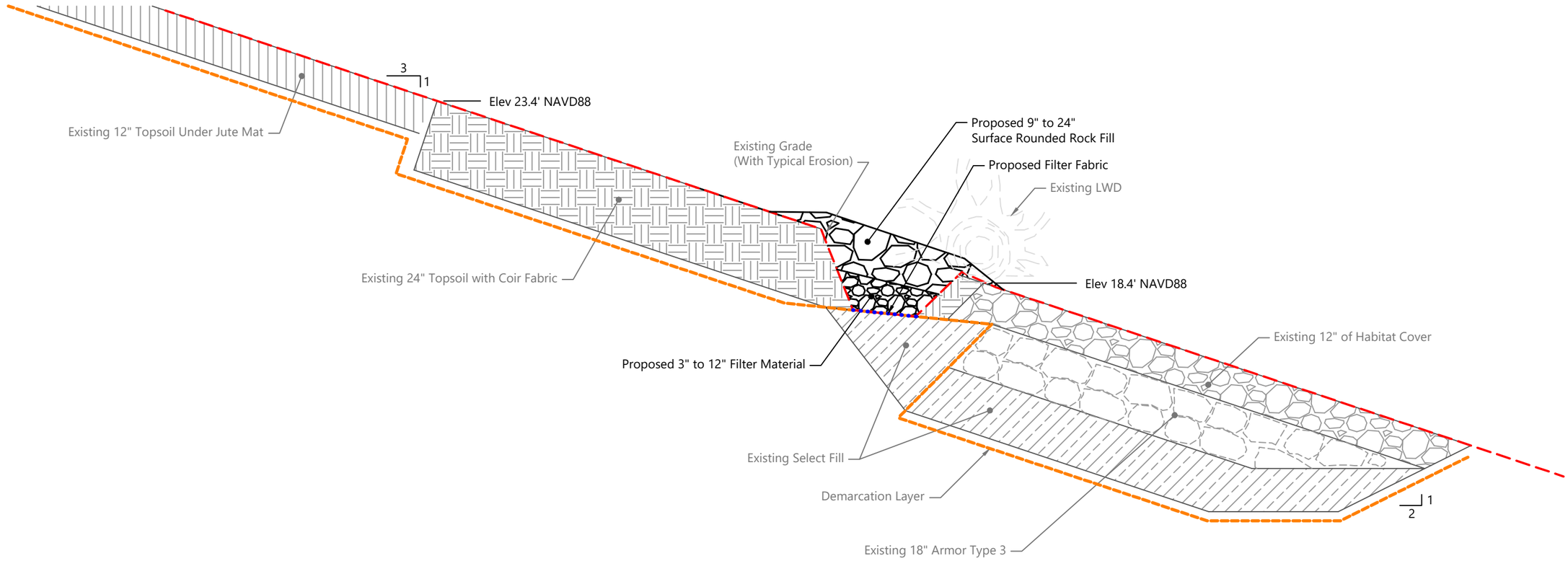
ANCHOR QEA

Figure 3
Willamette River Level and Erosion Analysis

Amendment to the 2008 Interim Monitoring and Reporting Plan – Terminal 4 Phase I Removal Action
Port of Portland



Section A-A' (Proposed Conceptual Repair)

Not to Scale

NOTES:

1. Proposed material thicknesses are not drawn to scale and extents of material placement vary amongst isolated erosion areas. Material thicknesses will be refined during a pre-construction site walk.
2. Vertical and lateral material overplacement not shown.

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Filepath: K:\Projects\0332-Port of Portland\Interim Monitoring & Reporting - T4RA\Task 7 - Adaptive Management Activities\0332-RP-003 Conceptual XS.dwg Figure 4

ANCHOR QEA

Figure 4
Conceptual Repair Cross Section

Amendment to the 2008 Interim Monitoring and Reporting Plan – Terminal 4 Phase I Removal Action
Port of Portland

Appendix A
2008 IMRP

APPENDIX C

INTERIM MONITORING AND REPORTING PLAN

TERMINAL 4 PHASE I REMOVAL ACTION
PORT OF PORTLAND, PORTLAND, OREGON

Prepared for

Port of Portland

Portland, Oregon

Prepared by

Anchor Environmental, L.L.C.

6650 SW Redwood Lane, Suite 333

Portland, Oregon 97224

June 30, 2008

Table of Contents

List of Figures

1 INTRODUCTION

1.1 Purpose and Scope of Interim Monitoring and Reporting Plan

This Interim Monitoring and Reporting Plan (IMRP) document provides the monitoring and reporting requirements between the completion of the Terminal 4 Phase I Removal Action work and the beginning of the Phase II Removal Action work. The current anticipated Phase II Removal Action schedule has the Slip 1 Confined Disposal Facility (CDF) beginning construction in the third quarter of 2010 with Slip 3 dredging being completed in the third quarter of 2011.

1.1.1 Berth 411 "Plus" Dredging

Surface samples will be collected within the Berth 411 "Plus" area after construction but before the end of 2008. The data will be used to assess the condition of this portion of Slip 3 and to help guide decisions regarding the scope and timing of Phase II of the Removal Action.

1.1.2 Head of Slip 3 Cap Integrity Monitoring

Monitoring will be completed to confirm the following:

- Armor layer stability
- Absence of sheens

1.1.3 Wheeler Bay Stabilization Area Monitoring

Monitoring will be completed to confirm the following:

- Slope stability
- Armor layer stability
- Establishment of vegetation
- Stability/presence of woody debris as designed

1.2 Related Design Documents

The Design Analysis Report (DAR) presents the basis of the design for the Phase I Terminal 4 Removal Action. The Construction Drawings (Appendix D to the DAR) and Specifications (Appendix E to the DAR) provide the detailed design elements. Appendices H, I, and J present the Removal Action Construction Sampling and Analysis Plan (SAP),

Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP), respectively, which will be followed for sampling activities presented within this document.

1.3 Organization of the IMRP

The remainder of this document provides detailed information on the development of the IMRP as follows:

- **Section 2 – Evaluation of Berth 411 "Plus" Dredging.** This section provides the monitoring objectives and criteria, as well as the scope, for the Berth 411 "Plus" dredge area.
- **Section 3 – Monitoring of the Head of Slip 3 Cap Area.** This section provides the monitoring objectives and criteria, as well as the scope, for the cap at the head of Slip 3.
- **Section 4 – Monitoring of the Wheeler Bay Shoreline Stabilization.** This section provides the monitoring objectives and criteria as well as the scope for the shoreline stabilization in Wheeler Bay.
- **Section 5 – Observation Schedule and Reporting.** This section provides the anticipated schedule for the items identified in Sections 2 through 4.
- **Section 6 – Potential Response Actions.** This section describes potential response actions if certain observations are made as part of the monitoring described above.
- **Section 7 – References.**

2 EVALUATION OF BERTH 411 "PLUS" DREDGING

2.1 Monitoring Objectives and Criteria

The performance standard of the Berth 411 "Plus" Phase I dredging is to remove the highest risk sediments, defined as those with surface sediments having a greater than 20 Probable Effects Concentration (PEC) exceedance ratio down to a specified elevation coinciding with PEC exceedance ratios of 10 or less, as predetermined by sediment core data. If full removal is not technically feasible, partial removal will be completed, and a 6-inch sand layer will be placed.

The Removal Action's Phase II objective will be to remove impacted sediments defined by as yet determined criteria. It is anticipated that the extent of the Phase II sediment removal will encompass portions of the Phase I Removal Action Area.

2.2 Surface Sample Collection

Surface samples will be collected after the dredging of Berth 411 "Plus" dredge area. Sampling stations will be located on a 50-foot grid (approximately 10 samples from the Berth 411 area; 2 samples from the Pier 5 dredge area; and 2 samples from the north of Berth 414 dredge area). Appendices H (Anchor 2008a) and I (Anchor 2008b) to the DAR present details on the sampling and analysis methods to be employed. Samples will be analyzed for the Slip 3 contaminants of concern, including:

- Metals (cadmium, lead, zinc)
- Polycyclic aromatic hydrocarbons (PAHs)
- Total petroleum hydrocarbons (TPH; diesel and motor oil range)

Four composite samples will be analyzed for polychlorinated biphenyls (PCBs) and dichloro-diphenyl-trichloroethanes (DDTs). The four composites will be prepared using aliquots from the surface samples that are collected, including:

- One composite prepared with aliquots from the two samples from the north of Berth 414 dredge area;
- One composite prepared with aliquots from the two samples from the Pier 5 dredge area;
- One composite prepared with aliquots from the two samples located within the sand cover in the Berth 411 area; and,

- One composite prepared with aliquots from the remaining eight samples located in the Berth 411 area.

Discrete samples used to create the composite samples will be archived at the laboratory to ensure availability for later analysis as directed by the U.S. Environmental Protection Agency (USEPA) (e.g., should elevated levels be detected in the composites).

3 MONITORING OF HEAD OF SLIP 3 CAP AREA

3.1 Monitoring Objectives and Criteria

The performance standards for the Head of Slip 3 cap are:

- Isolate the surface sediments containing elevated contaminant concentrations from benthic communities and the aquatic environment by applying appropriate long-term erosive as well as contaminant transport mechanisms.
- Where necessary, the chemical isolation layer shall be designed to contain sheens exiting from the shoreline.
- The armor layer of the cap shall be designed to resist bed shear velocities induced by the largest of 100-year flood flow, 100-year waves, vessel-induced waves from typical passing vessels, and anticipated propeller wash from vessels that operate in the area.

To meet these standards, the following monitoring objectives and criteria are established:

- Confirm the stability of the cap
- Confirm the control of sheens

3.2 Armor Layer Stability

The following activities will be completed:

- A visual survey of the slope upland of the pinch-pile wall for sloughing/stability will be completed to determine if it is stable.
- A survey of the pinch-pile wall to assess stability of the wedge in front of the wall.

Transects will be walked at low water levels to complete visual surveys of the slope. Transects will be established on 40-foot spacings perpendicular to the shoreline (3 transects). The observer will walk the transects looking for evidence of instability. Areas of instability will be noted on drawings.

A surveyor's spike will be inserted in the top of the pinch-pile wall at 40-foot spacings (3 monitoring points). Successive surveys will be compared to the baseline (immediately after completion of construction) survey. In the event of movement greater than 1 inch compared to baseline, a diver survey will be completed to assess the condition of the wedge in front of the pinch-pile wall.

3.3 Presence of Sheens

The following activities will be completed:

- A survey for the visual presence of sheens will be completed at different water level conditions.

The site will be walked on 20-foot transects parallel to the shoreline to observe the presence of sheens. The site will be walked at a water level of approximately 5 feet National Geodetic Vertical Datum (NGVD) and 10 feet NGVD for the presence of sheens. Any significant sheens observed will be noted on drawings.

4 MONITORING OF WHEELER BAY SHORELINE STABILIZATION

4.1 Monitoring Objectives and Criteria

The performance standards for the Wheeler Bay shoreline stabilization are:

- Regrade banks to slopes that are naturally stable.
- Stabilize targeted shoreline areas to address appropriate long-term erosive mechanisms.
- For areas where armoring is necessary, the armor layer shall be designed to resist bed shear velocities induced by the largest of 100-year flood flow, 100-year waves, vessel-induced waves from typical passing vessels, and anticipated propeller wash from vessels that operate in the area. A habitat layer will be placed on top of the armor layer. Note that the intent of the habitat cover is to allow it to naturally accrete or erode and that it will not be maintained.

To meet these standards, the following monitoring objectives and criteria are established:

- Confirm the stability of the slope. This will include visual monitoring of the slope for sloughing, erosion gullies, and other indicators of erosion.
- Confirm that the vegetation is establishing by monitoring vegetation coverage.
- Confirm no substantial movement of armor stones.

4.2 Slope Stability

The following activities will be completed:

- A visual survey of the slope for sloughing/stability and erosion will be completed to determine if it is stable.

Observers will walk the entire slope looking for areas of instability. Areas of instability will be noted on drawings.

4.3 Establishment of Vegetation

The vegetation in the stabilization areas will be evaluated to determine if the vegetation is serving its intended function. The vegetation between elevations 15 and 30 feet NGVD (willow plantings between elevations 15 to 20 feet NGVD and hydroseeding between elevations 20 to 30 feet NGVD) will be monitored in years 3 and 5 to confirm cover is occurring.

Seasonally (at least twice per year) during the first 5-year monitoring period, the Port will remove non-native species, invasive species, and noxious weeds from the elevation 15 to 30 feet NGVD.

Additionally, the Port will provide measures (string covers) as needed to prevent excessive vegetation destruction by geese.

4.3.1 Willow Planting Establishment

Willow plantings will be established between elevations 15 to 20 feet NGVD. The coverage goals for the project are (note that year 1 is the construction year):

- 50 percent coverage in year 3
- 80 percent coverage in year 5

In addition, a year 2 observation will be made; however, results will be reported in the year 3 period.

Coverage will be determined using the following Point Intercept Transect (PIT) procedure:

- Transects will be completed every 100 feet along the stabilization area planted.
- A rag tape will be laid along the slope from elevation 15 feet to elevation 30 feet NGVD.
- A survey will occur every 2 feet along the tape. If vegetation occurs within a vertical line up from the survey point, this survey point will be considered having vegetative cover.
- A statistical average of the percent coverage will be determined using all of the data points from each transect. The average will be determined for the entire surveyed area and compared to the goals presented above.

4.3.2 Grass Planting Establishment

Grass plantings will be established between elevations 20 to 30 feet NGVD. The coverage goals for the project are (note that year 1 is the construction year):

- 80 percent coverage in year 3
- 80 percent coverage in year 5

In addition, a year 2 observation will be made; however, results will be reported in the year 3 period.

Grass coverage will be determined based on a visual assessment of the entire elevation 20 to 30 feet NGVD area coverage.

4.4 Armor Layer Stability

The following activities will be completed:

- A visual survey of the riprap layers will be completed to determine if excessive erosion is occurring.

Transects will be walked at low water levels to complete visual surveys of the armor layer. Transects will be established on 100-foot centers perpendicular to the shoreline (approximately 8 transects). The observer will walk the transects looking for evidence of erosion within the armor layer. Areas of erosion will be noted on drawings.

5 OBSERVATION SCHEDULE AND REPORTING

The head of Slip 3 cap and Wheeler Bay shoreline stabilization observation programs described above will be completed under the following schedule:

- Baseline conditions at the end of construction (as-built drawings).
- At the end of the first high water season during low water levels. Much of the observation work requires low river levels to properly complete. Therefore, observations in June are anticipated.
- Yearly thereafter until the Phase II work begins.
- Vegetation observations will occur monthly during the first year, with summary reporting at the end of the first year.

Reports will be submitted to USEPA yearly. Reports will consist of technical memoranda with color photos of a reasonable size to interpret the conditions, a description of site conditions observed, data summaries, a statement of any deficiencies found, recommended corrective action(s), and a schedule for implementing the corrective action(s).

The Berth 411 "Plus" dredging sampling will be completed before the end of 2008.

6 POTENTIAL RESPONSE ACTIONS

6.1 Berth 411 "Plus" Dredge Area

Grab samples will be collected after dredging to confirm that the area where the removal action occurred is below a PEC exceedance ratio of 10. The data will be analyzed collaboratively with USEPA, and if warranted, potential additional actions will be discussed with USEPA.

6.2 Head of Slip 3 Cap

This section describes potential response actions if certain observations are made as part of the monitoring described in Section 3. There are three potential issues with the head of Slip 3 cap that would warrant response actions, including:

- The armor layer becoming unstable
- The armor layer beginning to erode
- Presence of sheens exiting the cap area

Potential response actions for each of these three scenarios are discussed in more detail below.

6.2.1 If Armor Layer Becomes Unstable

If the armor layer is determined to be unstable such that it compromises the integrity of the cap behind the pinch-pile wall, the following measures would be completed:

- Determine the cause of failure.
- Address the stability based on the findings. Measures to improve the stability may include:
  - Placing additional material down slope of the pinch-pile wall
  - Structurally improving the bulkhead with bracing

6.2.2 If Armor Layer Begins Eroding

If the armor layer is determined to be eroding such that it compromises the integrity of the cap, the following measures would be completed:

- Determine the cause of erosion.
- Address the erosion based on the findings. Measures to improve the erosion may include:

- Increasing the gradation and/or thickness of the armor layer

6.2.3 If Sheens are Present

If the sheens are present, the following measures would be completed:

- Determine the cause of sheens.
- Address the source based on the findings. Measures to control sheens may include:
  - Placing additional sheen control material

6.3 Wheeler Bay Shoreline Stabilization

This section describes potential response actions if certain observations are made as part of the monitoring described in Section 4. There are three potential issues with the Wheeler Bay shoreline stabilization that would warrant response actions, including:

- The slope becoming unstable
- The armor layer beginning to erode
- The slope vegetation becoming stressed or failing

Potential response actions for each of these three scenarios are discussed in more detail below.

6.3.1 If Slope Becomes Unstable

If the slope is determined to be unstable such that it compromises the integrity of the shoreline stabilization, the following measures would be completed:

- Determine the cause of failure.
- Address the stability based on the findings. Measures to improve the stability may include:
  - Regrading of the slope
  - Placement of a toe buttress

6.3.2 If Armor Layer Begins Eroding

If the armor layer is determined to be eroding such that it compromises the integrity of the shoreline slope, the following measures would be completed:

- Determine the cause of erosion.

- Address the erosion based on the findings. Measures to improve the erosion may include:
  - Increasing the gradation and/or thickness of the armor layer

6.3.3 If Vegetation Becomes Stressed or Fails

If the vegetation is determined to be stressed or failing to serve its purpose such that it compromises the integrity of the shoreline slope, the following measures would be completed:

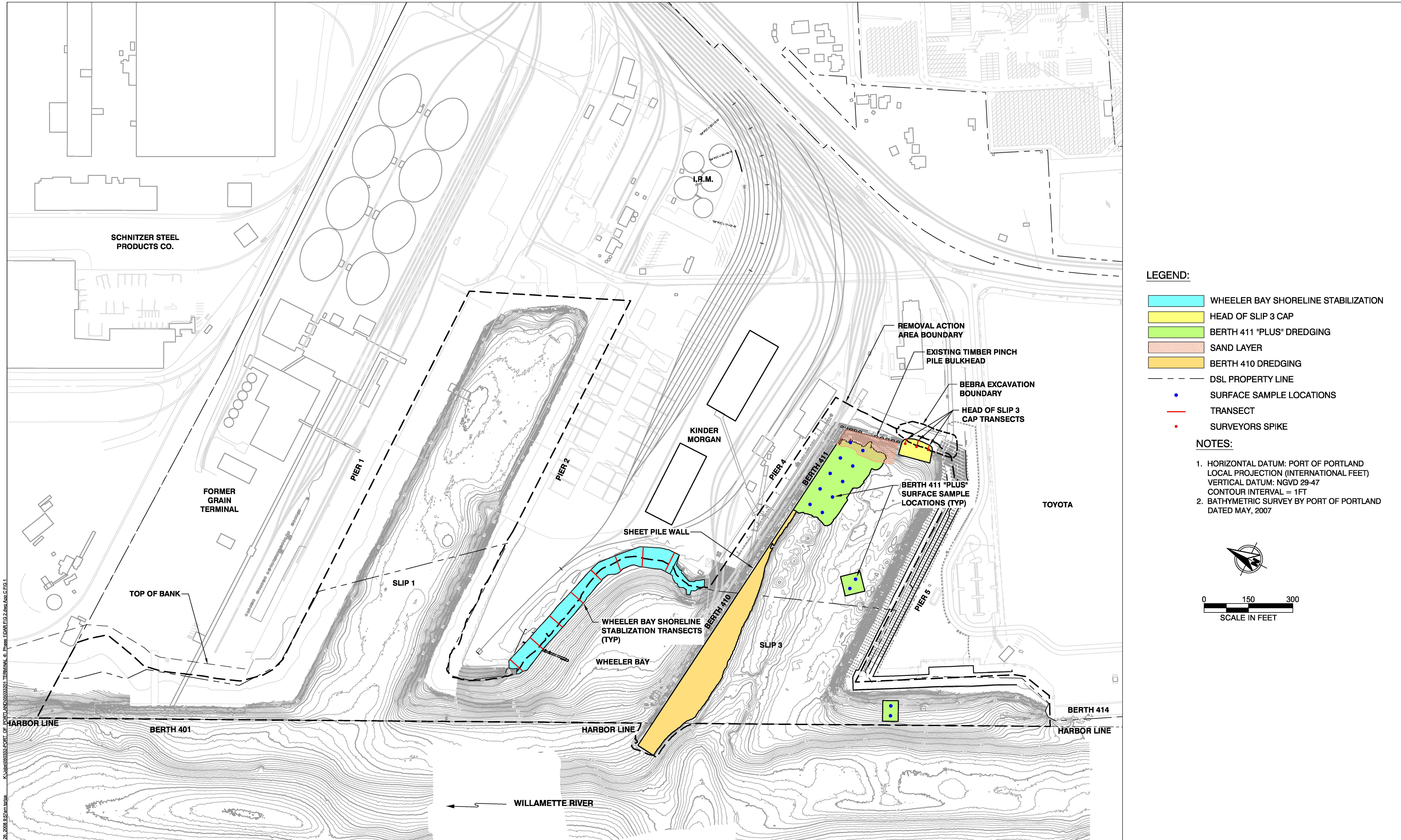
- Determine the cause of vegetation distress.
- Address the distress based on the findings. Measures to improve vegetation stress may include:
  - Selecting different vegetation
  - Changing the care of the existing vegetation

7 REFERENCES

Anchor Environmental, L.L.C. (Anchor). 2008a. Appendix H to Design Analysis Report: Removal Action Construction Sampling and Analysis Plan. Terminal 4 Phase I Removal Action: Port of Portland, Portland Oregon.

Anchor. 2008b. Appendix I to Design Analysis Report: Removal Action Construction Quality Assurance Project Plan. Terminal 4 Phase I Removal Action: Port of Portland, Portland Oregon.

FIGURES



ANCHOR ENVIRONMENTAL, L.L.C.

Figure 1
Interim Survey Locations
Terminal 4 Phase I Removal Action
Portland, Oregon

Appendix B
Placement Materials for the Wheeler Bay Shoreline Stabilization Repairs

6720 SW Macadam Avenue, Suite 125
Portland, Oregon 972191
503.670.1108

ANCHOR QEA

Memorandum

January 15, 2020

To: Kelly Madalinski, Marcel Hermans, and Teresa Jacobs, Port of Portland

From: Elizabeth Greene, John Verduin, and Joe Smith, Anchor QEA, LLC

Re: Placement Materials for the Wheeler Bay Shoreline Stabilization Repairs

Introduction

The purpose of this memorandum is to present the materials that would be used to fill isolated erosion areas as part of future Wheeler Bay shoreline stabilization repairs. The materials and methods presented in this memorandum are consistent with those presented in the *Wheeler Bay Shoreline Stabilization Repair Work Plan* (Anchor QEA 2019) and used in the subsequent repairs.

Recommended Materials

As shown in Figure 1 (attached), filter material and an overlying layer of rounded rock would be placed in each future isolated erosion area that may require repair. Information on each material type is provided in this memorandum and in the attached supplemental details (Attachment 1). Additional information regarding the repairs was included in the *Wheeler Bay Shoreline Stabilization Repair Work Plan* (Anchor QEA 2019) and the *Monitoring and Adaptive Management Plan for the Wheeler Bay Shoreline Stabilization Area* (Anchor QEA 2020).

Surface Rounded Rock Fill

To address concerns raised by the U.S. Environmental Protection Agency and its partner agencies, a surface material consisting of rounded rock that is smaller than riprap would be used. For the 2019 shoreline stabilization repair (Anchor QEA 2019), Anchor QEA contacted local quarries and determined that a 2- to 6-inch rounded rock material was readily available from CalPortland's Scappoose, Oregon location. The gradation of the material was such that 100% of the material passed a 6-inch screen, and 0% of the material passed a 2-inch screen. Anchor QEA spoke with CalPortland's Scappoose quality assurance/quality control lead, who indicated that the material was generally a well-graded mixture of all sizes between 2- and 6-inch rock. If available, the material described in this section would be used. A similar material would be considered if the material described in this section is not available in the future.

Filter Material

To provide added stability to the surface rounded rock fill and to prevent winnowing of fine-grained riverbank soil through the larger pore sizes in 2- to 6-inch surface rounded rock fill, an intermediate

grain size would be placed between the fine-grained existing material and the coarse-grained surface rounded rock fill. For the 2019 Wheeler Bay shoreline stabilization repair work, Anchor QEA reviewed the grain size analysis performed by Carlson Testing, Inc. (Attachment 1), in September 2008 and determined the stockpiled fish habitat material would provide adequate stability and protection from winnowing. Any remaining stockpiled fish habitat material would be used as the repair project filter material. If additional filter material is needed, similar material would be imported, and testing would be performed to ensure the material meets the import material chemical goals presented in the *Final Design Analysis Report* (Anchor 2008).

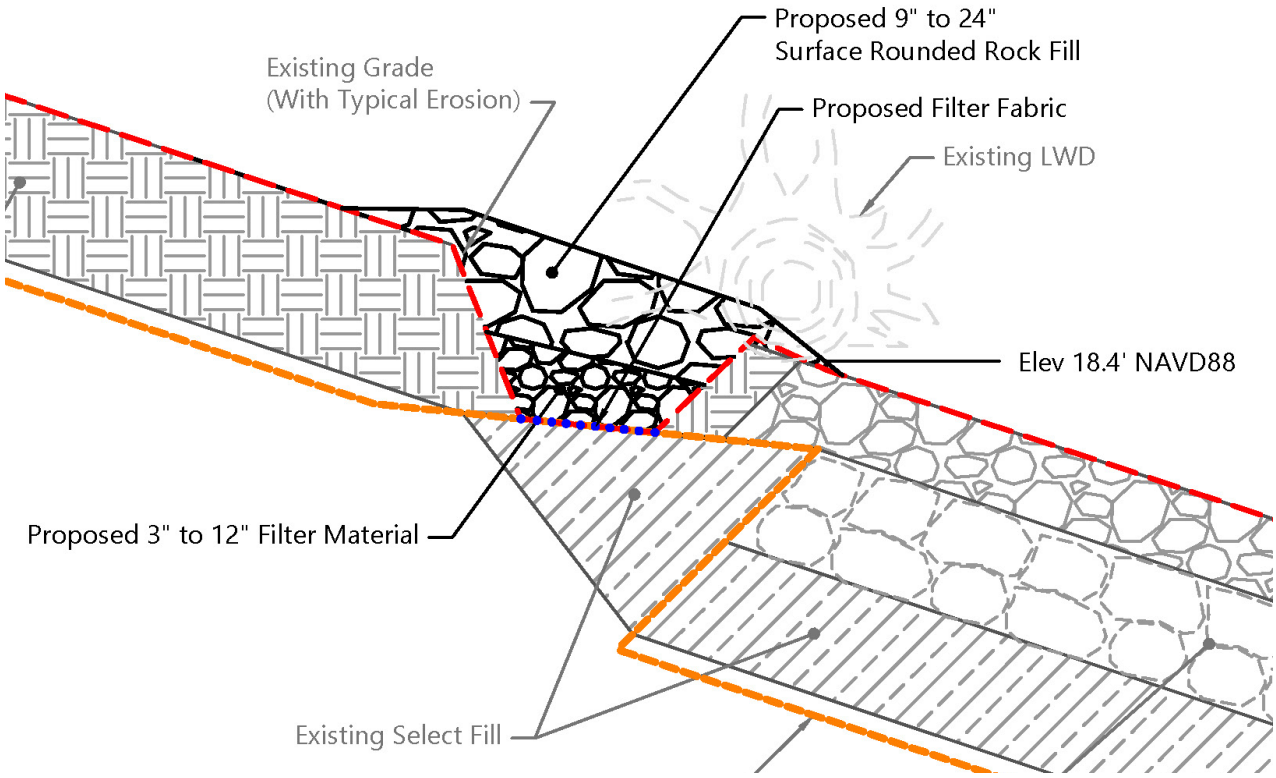
References

Anchor (Anchor Environmental, L.L.C.), 2008. *Final Design Analysis Report*. Terminal 4 Phase I Removal Action, Port of Portland, Portland, Oregon. Prepared for the Port of Portland. June 30, 2008.

Anchor QEA (Anchor QEA, LLC), 2019. *Wheeler Bay Shoreline Stabilization Repair Work Plan*. Terminal 4 Phase I Removal Action – Wheeler Bay Shoreline Slope Stabilization. Prepared for the Port of Portland. June 2019.

Anchor QEA, 2020. *Monitoring and Adaptive Management Plan for the Wheeler Bay Shoreline Stabilization Area*. Terminal 4 Phase I Removal Action, Port of Portland, Portland, Oregon. Prepared for the Port of Portland. January 2020.

Figure



Notes:
1. This detail was taken from the forthcoming *Wheeler Bay Shoreline Stabilization Repair Work Plan*.
2. Extents of material placement vary among isolated erosion areas.
3. Vertical and lateral material overplacement not shown.

Filepath: \\fuji\anchor\Projects\Port of Portland\CONFIDENTIAL_T4\Wheeler Bay Stabilization Shoreline Repair\Monitoring and Adaptive Management Plan\03_Appendices\App A\Figure 1.docx

ANCHOR QEA

Figure 1
Detail from Repair Conceptual Cross Section
Placement Materials for the Wheeler Bay Shoreline Stabilization Repairs
Terminal 4 Phase I Removal Action – Wheeler Bay Stabilization Slope Repair

Attachment 1
Laboratory Test Results

Carlson Testing, Inc.

Fax Transmittal

☒ Tigard Office (Main)
8430 SW Hunziker
Tigard, OR 97223
Phone: (503) 684-3460
Fax: (503) 684-0954

☐ Salem Branch Office
4060 Hudson Avenue, NE
Salem, OR 97301
Phone: (503) 589-1252
Fax: (503) 589-1309

☐ Bend Branch Office
P.O. Box 7918
Bend, OR 97708
Phone: (541) 330-9155
Fax: (541) 330-9163

Date 9-9-08 Number of Pages: 3 (Including Cover Sheet)

Please deliver this fax transmittal information to the following person. If you have received this information in error, please destroy it.

To: Suzanne

Company: Envirocon

Fax #: 503-285-6205 Telephone #:

From: Ben

Comments: Lab test results

If you did not receive all pages please contact our office at your earliest convenience.

Thank You

SIEVE ANALYSIS #1

PROJECT: Wheeler Bay Terminal #4 SAMPLE METHOD: Client BILL CODE: 202

CLIENT: EnviroCon SAMPLED BY: Client DATE:

SUPPLIER: Glacier SAMPLED FROM: BARGE

MATERIAL TYPE: Fish Mix DATE STARTED: 9/3/08 DATE FINISHED: 9/9/08

DATE REC'V. IN LAB: 9/3/08 LAB LOG #: 08-1081 TESTED BY: Adam Rose

BALANCE #: 2927 SHAKER #: 786 WASH #200 SIEVE #: 4237

METHOD OF TESTING

AASHTO T11 X AASHTO T27 X ASTM C117 ___ ASTM C136 ___

SIEVE SIZES	SIEVE LOG #	WEIGHT RETAINED			PERCENT RETAINED	PERCENT PASSING	FINENESS MODULUS	SPECIFICATION Habitat Cover Specs.
		WEIGHT 1	WEIGHT 2	TOTAL				
2"	0.0	0.0	0.0	0.0	0.0	100		90-100
1½"	0.0	0.0	106.1	106.1	.6	99		-
¾	3654.0	1892.3	915.2	6461.5	36.3	63		60-80
½	207.8	138.6	69.9	416.3	2.3	61		-
¼	992.0	855.8	536.8	2384.6	13.4	47		-
4	129.7	121.0	76.4	327.1	1.8	46		40-60
10	107.4	85.7	66.3	259.4	1.5	44		-
40	1805.6	1684.1	1235.5	4725.2	26.5	18		15-35
100	978.9	1128.5	749.6	2857.0	16.0	2		-
200	32.6	60.4	25.7	118.7	.7	0.9		0-5
PAN	3.9	5.6	4.6	14.1	.1	N/A		-
Ratio			TOTAL	17,670.0				

Weight Wet: 18403.7 Weight Dry: 17811.1 % Moisture: 3.3

Dry Weight After Wash: 17695.5 Weight After Sieve: 17,670.0 % Sieve Loss: .14

Remarks:

Tested in accordance with stated procedures with equipment in current calibration by: Adam Rose

Reviewed By: [signature] Date: 9/9/08

Revision 06/05

SIEVE ANALYSIS #2

PROJECT: Wheeler Bay Terminal #4 SAMPLE METHOD: Client BILL CODE: 202

CLIENT: ENVIROCON SAMPLED BY: Client DATE: _____

SUPPLIER: Glacier SAMPLED FROM: BARGE

MATERIAL TYPE: Fish Mix DATE STARTED: 9/3/08 DATE FINISHED: 9/9/08

DATE REC'V. IN LAB: 9/3/08 LAB LOG #: 08-1081 TESTED BY: Adam Rose

BALANCE #: 2922 SHAKER #: 786 WASH #200 SIEVE #: 4237

METHOD OF TESTING

AASHTO T11 X AASHTO T27 X ASTM C117 ___ ASTM C136 ___

SIEVE SIZES	[illegible] Weight 3	WEIGHT RETAINED			PERCENT RETAINED	PERCENT PASSING	FINENESS MODULUS	SPECIFICATION Habitat Cover Spec.
		WEIGHT 1	WEIGHT 2	TOTAL				
2	0.0	0.0	0.0	0.0	0.0	100		90-100
1½"	0.0	0.0	718.5	718.5	3.2	97		-
¾"	3038.1	3133.1	1940.0	8111.2	36.4	60		60-80
½"	172.0	295.0	122.4	589.4	2.6	58		-
¼	1139.2	1183.6	636.8	2959.6	13.3	45		-
4	167.4	165.3	92.1	424.8	1.9	43		40-60
10	126.5	121.4	76.2	324.1	1.5	41		-
40	2346.4	2142.6	1344.4	5833.4	26.2	15		15-35
100	1446.5	1111.0	865.6	3123.1	14.0	1		-
200	72.4	39.0	43.0	154.4	.7	0.2		0-5
PAN	6.7	4.9	5.6	17.2	.1			
Ratio				22255.7				

Weight Wet: 23472.3 Weight Dry: 22709.7 % Moisture: 3.4

Dry Weight After Wash: 22275.2 Weight After Sieve: 22255.7 % Sieve Loss: .09

Remarks: _____

Tested in accordance with stated procedures with equipment in current calibration by: Adam Rose

Reviewed By: _____ Date: 9/9/08

Revision 10-05-1

Appendix C
Site-Specific Health and Safety Plan (HASP) for Existing Hazardous Materials Releases

Port of Portland – Marine Terminal 4

Terminal 4 Wheeler Bay Shoreline Stabilization Repair

Site-Specific Health and Safety Plan (HASP) for Existing Hazardous Materials Releases

June 28, 2019

This Site-Specific Health and Safety Plan (HASP) takes into consideration the provisions of Oregon Administrative Rule 437 Division 2, Subdivision H, and Division 3, Subdivision D.

The planned repair activities do not include cleanup operations, Resource Conservation and Recovery Act (RCRA) hazardous waste operations, or emergency response operations defined in 29 Code of Federal Regulations (CFR) 1910.120(a)(1)(i) through 1910.120(a)(1)(v).

The HASP will be reviewed and updated as needed.

Prepared by:

Gregg R. Bieber, CSP

Gregg Bieber
Safety Program Administrator
Port of Portland

June 28, 2019

Table of Contents

Attachments

1.0 OVERVIEW

1.1 Introduction

The *Final Wheeler Bay Shoreline Stabilization Repair Work Plan* (Work Plan) presents an overview of the repair approach and the details for the implementation and quality control of the Terminal 4 Phase I Removal Action Wheeler Bay shoreline stabilization repair of isolated areas of erosion along the Wheeler Bay shoreline. The Port of Portland (Port) intends to repair the shoreline to ensure the stabilization of the bank meets its objective to protect human health and the environment by minimizing the potential for future erosion.

Phase I of the Removal Action included stabilization of the Wheeler Bay shoreline to minimize contaminant migration to the river. This involved shoreline excavation and grading; placement of sand, gravel, and armor stone on contaminated sediments followed by placement of topsoil and erosion control materials; and installation of plantings on the shoreline bank. Due to erosion issues, the original shoreline stabilization needs to be repaired by placing additional sand, gravel, and rounded rock material within isolated erosion areas.

1.2 Background

The Phase I Removal Action final design was completed and implemented by the Port in 2008 and included stabilization of the Wheeler Bay shoreline to minimize contaminant migration to the river.

Monitoring activities of the shoreline stabilization area occur on a regular basis in accordance with the requirements of the *Interim Monitoring and Reporting Plan* to determine if the shoreline stabilization is functioning as intended and meeting performance objectives. In June 2010, site monitoring activities found areas of erosion extending above elevation 18.4 feet North American Vertical Datum of 1988 (NAVD88) and into the willow planting area. This erosion was repaired in October 2010.

Monitoring activities after a high-water event in May and June 2011 found additional areas of erosion. There were small areas of erosion noted during the monitoring event. In October 2011, rock armor was placed up to 24.4 feet NAVD88 to repair this area. In 2017, two discrete sections of orange demarcation fencing (Station 4+00 and between Stations 6+55 and 6+80) were observed following the 2017 spring high-water event (Anchor QEA 2018a). In addition, two isolated areas of orange demarcation fabric were observed at Stations 3+75 and 5+25 in August 2018 during a post-high-water event monitoring (Anchor QEA 2018b).

On October 1, 2018, the Port submitted the "Wheeler Bay Design Approach Memorandum" (Anchor QEA 2018c) to the U.S. Environmental Protection Agency (USEPA) presenting the

Port's proposal for a comprehensive shoreline stabilization repair (i.e., placement of additional armor rock) to protect the shoreline and limit future areas of isolated erosion that can lead to contaminant exposure. Following comments from USEPA and its partner agencies, the Port proposed to conduct only localized repairs and place sand and gravel material in the erosional areas to determine the effectiveness of this type of repair while also addressing all immediate repair needs. In accordance with USEPA and partner agency concerns, no riprap or angular rock material would be placed, and no vegetation would be removed; therefore no mitigation will be required.

1.3 Scope

In general, the repair will consist of placing rounded rock over a filter layer of sand and gravel in the isolated erosion areas exposing orange demarcation fencing (Figure 3 of the Work Plan). No additional armor rock (i.e., riprap) will be placed and no existing vegetation will be removed as part of the repair.

Although polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) within the project area do not exceed the risk-based concentration for construction workers, this HASP is designed to establish procedures to minimize exposure to residual PAHs and PCBs while working around the soil. All site workers are responsible for complying with the elements of this plan as well as applicable Occupational Health and Safety Act (OSHA) safety and health requirements.

This HASP does not cover the physical hazards associated with soil handling and placement. Those will be addressed in routine Job Hazard Analysis development and review.

1.4 Responsibilities

The Port Marine Facility Maintenance (MFM) Site Foreman is responsible for communicating the site hazards and exposure controls of this plan to MFM site workers, contractors, and subcontractors. Port Safety staff will assist as requested.

1.4.1 Safety Program Administrator (SPA)

The Safety Program Administrator will provide an initial briefing on the contents of this HASP to all field personnel prior to the start of field activities on the site. Following the briefing, all field personnel will be given the opportunity to ask questions and will sign the HASP Compliance Form provided in Attachment B-1.

1.4.2 Site Health and Safety Coordinator (SHSC)

The MFM Site Foreman shall be designated as the Site Health and Safety Coordinator (SHSC). The SHSC is responsible for site-wide compliance with this HASP.

The SHSC will continue to evaluate the HASP for adequacy throughout the field operations and will incorporate changes as may be required by changes in site activities.

The SHSC will:

- Ensure that personnel are aware of all provisions of the HASP and are instructed in the safe work practices.
- Monitor the work area and ensure compliance of workers relative to pre-established personal protection levels.
- Ensure that daily briefings are conducted.
- Initiate emergency response procedures.
- Exercise stop-work authority in the event of unanticipated contamination.
- Resolve any non-compliance issues.
- Conduct regular inspections to determine effectiveness of the HASP.

1.4.3 Field Personnel

Field personnel are responsible for:

- Complying with this HASP and OSHA requirements.
- Taking all reasonable precautions to prevent injury to themselves and to fellow employees.
- Conducting only those tasks that they believe they can do safely.
- Reporting all occurrences and/ or unsafe conditions to the SHSC.

2.0 MANAGEMENT

2.1 Training

Site workers whose jobs require soil work that may generate dust and/or requires direct contact with soil shall be trained on this HASP prior to beginning site work. At the completion of training, workers shall complete competency testing to verify their understanding of this HASP, including:

- Personnel roles and responsibilities: staff will understand the lines of authority regarding health and safety, as well as personal roles and responsibilities
- Site-specific health and safety hazards
- Personal protective equipment (PPE): personnel will be informed of the required level of personal protection required on site and the appropriate use and disposal of PPE
- Safe work practices/engineering controls: staff will be informed of site-specific work practices and engineering controls, which will reduce the risk of exposure to site hazards
- Communication methods: staff will be informed of means of normal and emergency communications
- Decontamination procedures: personnel will be trained in proper decontamination procedures
- Emergency response: personnel will be trained to respond appropriately in the event of any emergency; access to local emergency medical care will be described

Training records shall be maintained by the EPM. Records must include:

- The employee's name
- Date(s) training was received
- Description of training materials used
- A copy of tests taken to verify competency

Site workers shall be retrained anytime the HASP is updated.

Site workers' job functions do not include cleanup operations, RCRA hazardous waste operations, or emergency spill response as defined under 29 CFR 1910.120, and do not, therefore, fall within the scope of OSHA's HAZWOPER standard.

Environmental contractors are available (by coordination through Port Environmental staff) to respond to discoveries of unanticipated suspected contaminated material if encountered. Work will stop in that area, and employees will avoid exposure until the hazard is evaluated and defined and, if needed, training is provided to address all changes implemented.

2.2 Medical Surveillance

Based on the previous soil sampling, site workers are not expected to receive exposures exceeding permissible exposure limits of residual constituents. If unanticipated suspected contaminated material, as defined in Section 3.2, is encountered, a stop work order will be initiated by the SHSC, and the suspected material will be addressed by a qualified environmental contractor coordinated by the EPM. Consequently, it is not anticipated that personal protection beyond level D will be required for site workers or that a pre-assignment or comprehensive medical exam will be required for any personnel.

3.0 HAZARDS

3.1 Constituents of Primary Concern (COPCs)

The following COPCs are known to be present within the project area:

- PAHs
- PCBs

Contaminated soils are demarcated by an orange colored barrier buried in the ground. All soils above the barrier are newer imported non-contaminated soils. The soils underneath the isolated repair areas do not present an immediate elevated level of health risk to workers. To minimize direct dermal contact and inhalation exposure pathways, dust suppression techniques may be employed and PPE may be worn, as specified in Section 4.3.1.

3.2 Unanticipated Contamination

Potential exposure to additional hazardous constituents could occur if unanticipated contaminated material is encountered. Such unanticipated material may be distinguished as being distinctly different in color than the surrounding native soil and/or having a chemical odor.

If unanticipated suspected contaminated material is encountered or suspected, do the following:

- Stop work in the area of such unanticipated material, and isolate the area
- Notify the Environmental Project Manager immediately (by cell phone):

Contact:	Kelly Madalinski
Email:	Kelly.Madalinski@portofportland.com
Phone:	(503) 415-6676
Cell:	(503) 349-7526

4.0 FIELD OPERATIONS

4.1 Engineering Controls

4.1.1 Barriers and Signs

Barricades, traffic cones, and/or marking or caution tape shall be erected at a safe distance from the work areas to prevent unauthorized access by vehicles and pedestrians. Barriers will be appropriate for the level of work activities and anticipated traffic. Signs will be conspicuously posted as the following, or equivalent:

"RESTRICTED AREA – Authorized Personnel Only"

Any visitors, regardless of their rank or professional level, will not be allowed into the work area unless training requirements have been met and documented.

4.1.2 Dust Control

When handling soil, soil shall be wetted as necessary to prevent visible dust from being generated in the work space. Water use should be adequate to control dust so as to prevent run-off. To aid in this, a misting nozzle shall be used.

4.2 Personal Protective Equipment

4.2.1 Levels of Protection

The following outlines the guidelines for Modified Level D protection:

- Work shirt and full-length pants or coveralls
- Closed-toed leather work boots or American National Standards Institute (ANSI) safety work boots (as appropriate with task activity safety level)
- ANSI standard hard hat (when working around heavy equipment or overhead "bump" hazards)
- ANSI standard safety glasses
- USEPA-approved hearing protectors (when working in high-noise areas, e.g., near steam cleaners and heavy equipment)

Some or all of the following:

- Chemical resistant gloves (needed for direct contact with soil)
- Boot covers or chemical-resistant boots
- Tyvek® coverall or equivalent (upgrade to polyethylene [PE] or Saranex-coated Tyvek® if direct contact is anticipated)

4.2.2 PPE Donning/Doffing Procedure

The following procedures are given as a guide. Failure to adhere to these procedures may result in the PPE being ineffective against COPC. These procedures may be altered by the SHSC if improvements can be made and these changes are warranted in the field. Also, some articles of PPE may not be necessary for all project tasks.

PPE Donning Procedure:

- Inspect all protective gear before donning.
- Don Tyvek® coverall or equivalent, inner gloves and outer gloves, secure with tape, as required, and leave pull tab. If coverall is loose, secure with tape to avoid capture in moving or rotating equipment.

PPE Doffing Procedure:

- Remove (if necessary) excess mud or other debris from outer boots, gloves, and clothing.
- Remove tape using pull tab, and remove outer clothing in the order of boots, outer gloves, and coverall suits. Place disposable and reusable PPE in designated (separate) containers.
- Remove inner gloves.
- Wash face, neck, and hands, as needed. Wipes should be made available on site.

Reusable PPE will be decontaminated, inspected, and maintained, as necessary, after each use. Personal equipment (e.g., safety glasses, leather safety-toe boots) shall be properly stored by the employee prior to reuse.

The SHSC will periodically inventory the disposable and reusable PPE at the work area and will replenish stocks in a timely manner.

4.2.3 Personnel Decontamination

Personnel decontamination shall be conducted prior to leaving the work area. The outer surface of boots shall be cleaned with a soft bristle brush and water.

All workers are required to wash their hands and face (as necessary) immediately prior to any work or lunch break or prior to eating, drinking, smoking, or when exiting the site.

4.2.4 Equipment Decontamination

Equipment shall be brushed clean of any accumulated dirt with a dry brush by workers prior to leaving the site. Where applicable, engineering controls shall be put in place to prevent soil from being tracked off site. To prevent runoff, water shall not be used to wash equipment.

ATTACHMENT B-1
HASP Compliance Form

HEALTH AND SAFETY PLAN ACCEPTANCE

I have had access to the HASP and opportunity to ask questions about this HASP. I have received site-specific information and orientation regarding HazCom and the identified hazards anticipated at the site. My signature certifies that I understand the procedures, equipment, and restrictions of this plan and agree to abide by them.

Signature	Printed Name	Company	Date

* This acceptance form is required for all routine personnel.

Appendix D
Sample Repair Tracking Form

Wheeler Bay Shoreline Stabilization
Repair Tracking Form

ANCHOR QEA

Date: _____

Project Name: Terminal 4 Phase I Removal Action

Erosion Observer Initials	Erosion Observation Date	Erosion Location and Desciption	Repair Date	Repair Location and Description	Contiguous Area of Exposed Demarcation Fabric (square feet)